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Consolidating gains and accelerating efforts to control and eliminate malaria in developing countries, particularly in Africa, by 2030

Note by the Secretary-General

The Secretary-General has the honour to transmit to the General Assembly the report of the Director-General of the World Health Organization, submitted in accordance with General Assembly resolution 70/300.

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Report of the Director-General of the World Health Organization on consolidating gains and accelerating efforts to control and eliminate malaria in developing countries, particularly in Africa, by 2030

Summary

The present report is submitted in response to General Assembly resolution 70/300. It provides a review of progress in the implementation of the resolution, focusing on the adoption and scaling-up of interventions recommended by the World Health Organization in malaria-endemic countries. It provides an assessment of progress towards the Sustainable Development Goals and resolution 70/300. It elaborates on the challenges limiting the full achievement of the targets, and provides recommendations to ensure that progress is accelerated towards the goals of the Global Technical Strategy for Malaria 2016-2030 in the coming years.

I. Introduction

1. While malaria is a preventable and treatable disease, it continues to have a devastating impact on people's health and livelihoods around the world. There were an estimated 212 million malaria cases and an estimated 429,000 deaths from malaria globally in 2015, with 70 per cent of these deaths occurring among children under 5 years of age in sub-Saharan Africa. The World Health Organization (WHO) recommends a multi-pronged strategy to reduce the malaria burden, including vector control interventions, preventive therapies, diagnostic testing, quality-assured treatment and strong malaria surveillance.

2. The present report highlights progress and challenges in the control and elimination of malaria in the context of General Assembly resolution 70/300, drawing on the *World Malaria Report 2016*, issued by WHO in December 2016. The analysis is based on the latest available comprehensive data (2015) received from malaria-endemic countries and organizations supporting global malaria efforts. Data from 2016 are currently being collected and reviewed by WHO.

3. Between 2000 and 2015, malaria received worldwide recognition as a priority global health issue. Under the umbrella of the Roll Back Malaria Partnership, endemic countries, United Nations agencies, bilateral donors, public-private partnerships, scientific organizations, academic institutions, non-governmental organizations (NGOs) and the private sector worked together to scale up WHO-recommended interventions, harmonize activities and improve strategic planning, programme management and funding availability. Together with HIV/AIDS, tuberculosis and other neglected tropical diseases, malaria control was included under Goal 3, target 3, of the Sustainable Development Goals, which aims to "end the epidemics of AIDS, tuberculosis, malaria and other neglected tropical diseases" by the year 2030. WHO interprets this target as the attainment of the targets of the Global Technical Strategy for Malaria 2016-2030. The Global Technical Strategy sets the target of reducing the malaria disease burden by at least 40 per cent by 2020 and by at least 90 per cent by 2030. It also aims to eliminate the disease in at least 35 new countries by 2030.

4. The success of efforts to control and eliminate malaria is measured through an analysis of trends in the disease burden and intervention scale-up, and a review of progress made towards the global goals and targets of the Global Technical Strategy, which were agreed through a broad, consultative process.

II. Current situation

5. Between 2000 and 2015, the expansion of malaria interventions helped to reduce malaria mortality rates by 62 per cent globally, averting an estimated 6.8 million deaths. In children under 5 years of age, malaria mortality rates fell by 69 per cent globally and by 38 per cent in Africa.

6. According to the *World Malaria Report 2016*, if the Global Technical Strategy milestone of a 40 per cent reduction in case incidence and mortality rates by 2020 is to be achieved globally, reductions in case incidence and mortality rates must be accelerated in countries with high numbers of cases and deaths. However, these countries are currently furthest from the per capita spending milestone for 2020.

7. In 2015, it is estimated that 13 countries accounted for 75 per cent of malaria deaths. The global burden of mortality is dominated by countries in sub-Saharan Africa, with the Democratic Republic of the Congo and Nigeria together accounting for more than 36 per cent of the global total of estimated malaria deaths. Almost all

deaths (99 per cent) resulted from *Plasmodium falciparum* malaria. *Plasmodium vivax* is estimated to have been responsible for 3,100 deaths, with four countries accounting for 81 per cent of estimated deaths attributable to *P. vivax* malaria (Ethiopia, India, Indonesia and Pakistan).

Vector control measures

8. The scale-up of insecticide-treated mosquito net distribution[1] and indoor residual spraying programmes have made a major contribution to the reduction in malaria burden since 2000. About 178 million long-lasting insecticidal nets were delivered to countries in sub-Saharan Africa in 2015. That same year, an estimated 79 per cent of the population at risk of malaria had access to one or more bednets in their household. However, this means that a fifth of households do not have access to any nets. Moreover, the proportion of households with sufficient bednets for all household members was just 42 per cent, substantially short of universal access (100 per cent).

9. In addition to mass distribution campaigns, WHO recommends the continuous distribution of insecticide-treated mosquito nets to all pregnant women attending antenatal care and all infants attending child immunization clinics. Between 2013 and 2015, mass campaigns accounted for 86 per cent of insecticide-treated nets distributed in sub-Saharan Africa, while antenatal clinics accounted for 10 per cent and immunization clinics for 4 per cent. With only 39 per cent of pregnant women reported to have attended antenatal care and 20 per cent of children reported to have attended immunization clinics receiving an insecticide-treated net between 2013 and 2015, these distribution channels appear underused. Some of the gap may be attributed to countries not yet adopting a policy to distribute insecticide-treated nets through these channels.

10. National malaria control programmes conduct regular indoor spraying of homes to reduce the mosquito population that can carry the disease. In 2015, 106 million people were protected through this intervention. The proportion of the population at risk protected by indoor residual spraying has declined globally, from a peak of 6 per cent in 2010 to 3 per cent in 2015, with decreases seen in all regions. In sub-Saharan Africa, the proportion of the population at risk protected by such spraying declined 10.5 per cent, to less than 6 per cent between 2010 and 2015. Declining coverage of indoor residual spraying may be attributed to a change from pyrethroids to more expensive insecticide classes such as carbamates and organophosphates, although heavy reliance on pyrethroids continues, particularly outside of the WHO African Region. Concurrent, sequential or mosaic use of insecticide classes with different modes of action is one component of a comprehensive insecticide resistance management strategy highlighted in the WHO Global Plan for Insecticide Resistance Management in Malaria Vectors.

11. In many countries, progress is threatened by the rapid development and spread of mosquito resistance to insecticides currently used for insecticide-treated nets and indoor residual spraying. A total of 60 of the 73 malaria-endemic countries that provided monitoring data for 2010 onward reported resistance to at least one insecticide, and 50 reported resistance to two or more insecticide classes. In 2016, WHO released the second edition of the *Test procedures for insecticide resistance monitoring in malaria vector control mosquitoes*, which provides an overview of two new methods for measuring insecticide resistance: the intensity bioassay and the synergist bioassay. Also in 2016, an evaluation coordinated by WHO of five

[1] Although WHO recommends the use of long-lasting insecticidal nets, given the continued use of conventional insecticide-treated nets, especially outside of Africa, the more generic term "insecticide-treated nets" is used throughout the present document.

countries showed that people who slept under long-lasting insecticide-treated nets had significantly lower rates of malaria infection than those who did not use a net, even though mosquitoes showed resistance to pyrethroids (the only insecticide class used in insecticide-treated nets) in all evaluation areas. The study reaffirms the WHO recommendation of universal coverage of pyrethroid-treated insecticide-treated nets for all populations at risk of malaria, while highlighting the urgent need for greater investment in new and improved tools.

12. The draft global vector control response 2017-2030 was developed to support the implementation of a broad but comprehensive approach to vector control that would enable the setting and achievement of disease-specific national and global goals and contribute to the attainment of the Sustainable Development Goals. The draft was endorsed by the Executive Board at the 140th session in January 2017, and the secretariat was requested to prepare a draft resolution for consideration at the 70th meeting of the World Health Assembly in May 2017. The response aims to support countries in mounting coherent and coordinated efforts to counter the increasing burden and threat of all vector-borne diseases, including malaria. It provides strategic guidance to countries and development partners for the urgent strengthening of vector control as a fundamental approach to preventing disease and responding to outbreaks.

Diagnostic testing and treatment

13. WHO recommends artemisinin-based combination therapies for the treatment of uncomplicated *P. falciparum* malaria, which is the most lethal malaria parasite and is responsible for the large majority of cases in Africa. The data available on the use of artemisinin-based combination therapies among all malaria treatments to children suggest that there has been an increase in the proportion of such therapies, from 29 per cent in 2010-2012 to 80 per cent in 2013-2015. However, the data suggest large variations between countries and further data are required to gain a greater understanding of the extent of barriers to accessing malaria treatment at the health facility and community levels.

14. Since 2010, WHO has recommended diagnostic testing of all suspected malaria cases when patients seek treatment at health clinics and pharmacies or by community health workers. The proportion of suspected malaria cases receiving a diagnostic test among patients presenting for care has increased in most WHO Regions since 2010. The largest increase has been in the WHO African Region, where diagnostic testing increased from 40 per cent of suspected malaria cases in 2010 to 76 per cent in 2015, owing mainly to an increase in the use of rapid diagnostic tests, which accounted for 74 per cent of diagnostic testing among suspected cases in 2015. However, the emergence of *P. falciparum* malaria with histidine-rich protein 2 and/or 3 gene deletions in multiple sites poses a new biological risk for malaria case management and surveillance because the parasites are not detected with the most commonly used rapid diagnostic tests. In May 2016, WHO published guidance[2] on how to investigate suspected false-negative rapid diagnostic test results, including *P. falciparum* histidine-rich protein 2 and/or 3 gene deletions, and on alternative rapid diagnostic test options. WHO is supporting member States to investigate suspected false negative test results consistent with *P. falciparum* histidine-rich protein 2 and/or 3 gene mutations and to address the implications for case management.

15. As highlighted in the Global Technical Strategy and in support of the Sustainable Development Goals target of achieving universal health coverage, community-based health programmes can significantly reduce malaria-related child

[2] Available from www.who.int/malaria/publications/atoz/information-note-hrp2-based-rdt/en/.

mortality in rural communities, and the approach is being scaled up around the world. In Africa, WHO and the United Nations Children's Fund have helped countries to expand efforts to scale up integrated community case management programmes, through which community health workers are trained to diagnose and treat children under 5 years of age for malaria, pneumonia and diarrhoea. Through the Rapid Access Expansion Programme, funded by the Government of Canada and supported by WHO and NGOs, 7,500 community health workers have been trained and deployed in five African countries since 2013, treating more than 1.7 million cases of malaria, over 900,000 cases of pneumonia, and nearly 700,000 cases of diarrhoea among children under 5 years of age. In India, the deployment of more than 900,000 accredited social health activists across the country by the Government in the past 10 years has ensured the provision of a basic package of preventive and curative care to all age groups. A similar scheme in Ethiopia, the Health Extension Programme, has secured the achievement of important gains in several health outcomes across the country since the deployment of health extension workers in 2005.

The threat of drug resistance

16. *P. falciparum* resistance to artemisinin has been detected in five countries in the Greater Mekong subregion — Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam. To tackle emerging multi-drug resistance, WHO has recommended an urgent scale-up of malaria vector control measures across the subregion, and a recalibration of efforts from resistance containment to regional malaria elimination by 2030. Since the launch of the WHO Strategy for Malaria Elimination in the Greater Mekong Subregion (2015-2030) in May 2015, all five countries have aligned their national strategies to target malaria elimination. Between 2012 and 2015, malaria case incidence has declined by an estimated 54 per cent and mortality rates by 84 per cent in the subregion. These efforts are supported by a WHO bi-regional hub in Phnom Penh to coordinate the multi-stakeholder response. The hub works closely with the ministries of health in Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam, as well as with a range of development partners. WHO recommends that all malaria-endemic countries conduct therapeutic efficacy studies at least every two years to inform national treatment policy.

17. The continued availability and use of oral artemisinin-based monotherapies poses a major risk to malaria control efforts globally, and has contributed to the emergence of artemisinin resistance. WHO has long recommended the withdrawal of oral artemisinin-based monotherapies from the market, and their replacement with combination therapies, as endorsed by the World Health Assembly in 2007. However, according to the latest available information, these medicines are still marketed by at least 21 companies around the world. Globally, 49 countries have withdrawn marketing authorization for these medicines but 7 countries continue to allow their marketing.

Malaria surveillance

18. Malaria case detection rates are gradually improving. However, it is estimated that only 19 per cent of cases were detected by malaria surveillance systems globally in 2015. There is a critical need to strengthen malaria surveillance systems to enable ministries of health to identify gaps in programme coverage, and to respond effectively to disease outbreaks. Strong surveillance also helps to guide changes in programme planning and implementation so that resources can be directed to populations most in need and can help to assess the impact of interventions.

19. Together with ensuring universal access to prevention, diagnosis and treatment, and accelerating efforts towards elimination, strengthening surveillance systems is one of the three pillars of the Global Technical Strategy for Malaria 2016-2030. The strategy urges countries to substantially expand malaria surveillance and transform it into a core intervention, as important as vector control, diagnostic testing or treatment. In addition to helping to accelerate progress towards the proposed 2030 targets, increased investments in malaria surveillance will ease the current reliance on model-based disease estimation methods, and enable national decision makers and the global health community to build on more reliable health information and malaria data.

20. A malaria surveillance system comprises the tools, procedures, people and structures that generate information on malaria cases and deaths. The information generated is then used for planning, monitoring and evaluating malaria control programmes. An effective malaria surveillance system enables programme managers to: identify the areas and population groups most affected by malaria; help to deliver the necessary interventions and advocate for resources; identify trends in cases and deaths that require additional intervention, such as residual foci of transmission and epidemics; regularly assess the impact of control measures and progress in reducing the disease burden; help countries to decide on where adjustments or combinations of interventions are required; provide relevant information to support the process of certification of elimination; and monitor whether the reintroduction of transmission has occurred and, if so, guide the response. WHO is updating the current guidance on surveillance, monitoring and evaluation for release in 2017.

Elimination and certification

21. The Global Technical Strategy calls for the elimination of malaria in at least 10 countries by 2020. According to an analysis undertaken by WHO for World Malaria Day 2016, 21 countries currently have the potential to achieve this target (Algeria, Belize, Bhutan, Botswana, Cabo Verde, China, Comoros, Costa Rica, Ecuador, El Salvador, Iran (Islamic Republic of), Malaysia, Mexico, Nepal, Paraguay, Republic of Korea, Saudi Arabia, South Africa, Suriname, Swaziland and Timor-Leste). In recent years, elimination efforts have been intensified in many parts of Africa, including in the "Elimination 8" countries of Southern Africa (Angola, Botswana, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe), in Central America and Hispaniola and in South-East Asia. In 2015, zero indigenous cases were reported from the WHO European Region for the first time, in line with the Tashkent Declaration to eliminate malaria from the region by 2015. Since 2000, six countries have been certified by WHO as free of malaria: the United Arab Emirates (2007), Morocco (2010), Turkmenistan (2010), Armenia (2011), Kyrgyzstan (2016) and Sri Lanka (2016). Two countries, Algeria and Paraguay, are expected to request official certification of elimination from WHO in the coming months.

22. In March 2017, *A framework for malaria elimination* was released; it is a revision of *Malaria elimination: an operational manual*, issued in 2007. Key new elements in the manual compared with the 2007 version are that all levels of malaria transmission are included instead of only moderate and low endemic settings; programme actions are highlighted across the continuum of transmission, from high to very low transmission; the critical role of information systems and surveillance as an intervention is emphasized; both rapid diagnostic tests and light microscopy are recommended for malaria diagnosis; the classification of transmission foci has been simplified to three instead of seven types; the proposed process for certification is streamlined; and the threshold for re-establishment of transmission is clarified.

23. The WHO Strategic Advisory Group on Malaria Eradication was established in August 2016 to advise the organization on the feasibility, potential strategies and cost of eradicating malaria over the next decades, building on the goals and targets set by the Global Technical Strategy and in the context of the Sustainable Development Goals. Over the next two years, members of the Advisory Group will analyse the evolving malaria landscape, taking into consideration a broad set of factors that underpin the disease: biological, technical, financial, socioeconomic, political and environmental. Members will review trends in poverty and population growth, mobility, agricultural use, urbanization and communication. They will consider, among other factors, the role of climate change and potential developments in research and innovation.

Global guidance from the World Health Organization

24. The Global Technical Strategy for Malaria 2016-2030 was adopted by the 68th World Health Assembly in May 2015, in its resolution WHA68.2. The strategy aims at providing countries with evidence-based technical guidance for the next 15-year period. The strategy was developed in close consultation with endemic countries and partners, and the process was overseen by the Malaria Policy Advisory Committee and a dedicated steering committee.

25. The document is built on the following three pillars: (a) ensure universal access to malaria prevention, diagnosis and treatment; (b) accelerate efforts towards elimination and the attainment of malaria-free status; and (c) transform malaria surveillance into a core intervention. The pillars are complemented by two supporting elements: (a) harnessing innovation and expanding research; and (b) strengthening the enabling environment. In the document, it is emphasized that progression towards malaria-free status does not consist of a set of independent phases; instead it is a continuous process requiring subnational stratification by malaria risk. It is also recognized that strong health systems are crucial for reducing the disease burden and the potential for onward transmission of parasites, as well as enabling the adoption and introduction of new tools and strategies within the shortest possible time frame.

26. The strategy provides the technical underpinning for the Roll Back Malaria Partnership's *Action and Investment to Defeat Malaria 2016-2030 — for a Malaria-Free World*, which was released in 2015. The focus of that document is on how the WHO strategy could best be implemented though global advocacy, resource mobilization, partner harmonization, and the engagement of the transportation, industry, tourism, education and other public sectors, as well as the private sector. It positions malaria firmly within the Sustainable Development Goals agenda, showing how progress towards multiple sustainable development goals will be contingent on the success of malaria efforts and vice-versa.

27. Since the previous progress report was prepared for the General Assembly in May 2016 (A/70/833), WHO has issued recommendations on testing for glucose-6-phosphate dehydrogenase (G6PD) deficiency for safe use of primaquine in radical cure of *P. vivax* and *P. ovale*, and on test procedures for insecticide resistance monitoring in malaria-vector mosquitoes. Other key guidance includes a policy brief and status report on artemisinin and artemisinin-based combination therapy resistance as well as an information note on false negative rapid diagnostic test results and the implications of new reports of *P. falciparum* histidine-rich protein 2 and/or 3 gene deletions. In December 2016, WHO issued a policy brief summarizing all malaria-related policies and interventions currently recommended by WHO. It aims at helping countries to develop funding proposals for the Global Fund to Fight AIDS, Tuberculosis and Malaria and other donors.

Global collaboration and political commitment

28. The Roll Back Malaria Partnership was transformed in 2016 to enhance its contribution to the fight against malaria. During that year, the Partnership was strengthened to mobilize the resources necessary for the global malaria response and to advocate for sustained political will and coordinated action. A new Partnership Board and Board leadership were recruited, new Roll Back Malaria by-laws to provide updated guiding governing principles for the Partnership moving forward were approved, and a more focused, flexible and efficient management team structure to ensure the focus and coordination of resources was designed. Dr. Kesetebirhan Admasu, the former Minister for Health of Ethiopia from 2012 to 2016, was appointed to the role of Chief Executive Officer and took up his function in February 2017.

29. In the Asia-Pacific region, recent years have witnessed growing political commitment to address the challenge of drug-resistant malaria. Countries of the region, with leadership from Australia and Viet Nam, launched the Asia Pacific Leaders Malaria Alliance at the East Asia Summit, held in Brunei Darussalam in October 2013. The mission of the Alliance is to support and facilitate the elimination of malaria across the Asia-Pacific region by 2030, or earlier if possible. As at 2016, 19 leaders in the region had committed to the Alliance, its 2030 elimination goal and its malaria elimination road map. The road map highlights key priorities to achieving region-wide elimination, including through uniting national efforts and regional action and ensuring high quality malaria services, tests, medicines, nets and insecticides. WHO has been supporting the secretariat of the Alliance at the Asian Development Bank, in Manila, with technical guidance.

30. African Heads of State and Government continued to meet twice a year for a dedicated malaria forum at the African Union Summit to reaffirm their commitment to eliminating malaria by 2030. In 2016, 49 Member States were working together under the aegis of the African Leaders Malaria Alliance. At the most recent forum, held in January 2017, African leaders reiterated their commitment to eliminate malaria on the continent. Seven countries were recognized for significant achievements in malaria control and elimination over the past five years. During that forum, King Mswati III of Swaziland was appointed as the new Chair of the Alliance.

III. Urgent funding needs

31. While global investments (including domestic and international funding) for malaria control have increased from an estimated $960 million in 2005 to $2.9 billion in 2015, these have remained relatively stable since 2010. The governments of malaria-endemic countries provided 32 per cent of total funding in 2015. International funding in 2015 accounted for 68 per cent of total funds for malaria control and elimination programmes, with the United States of America as the largest international funder (35 per cent), followed by the United Kingdom of Great Britain and Northern Ireland (16 per cent). About half of international funding (45 per cent) was channelled through the Global Fund. Domestic governments provided 32 per cent of total malaria funding that year, a commendable increase from the previous year. Total domestic contributions were greatest in the WHO African Region ($528 million), followed by the WHO Region of the Americas ($202 million) and the WHO South-East Asia Region ($92 million).

32. To achieve the targets and goals set out in the Global Technical Strategy for Malaria 2016-2030, including a 40 per cent reduction in malaria case incidence and mortality rates, international and domestic contributions for malaria will need to

increase to an estimated $6.4 billion per year by 2020. Beyond 2020, annual investments will need to increase to an estimated $7.7 billion by 2025 to reach a 75 per cent reduction in the malaria burden, and to $8.7 billion by 2030 to meet the goal of a 90 per cent reduction in the malaria burden. To close the financing gap, new financial mechanisms are being explored that will complement the need for increased domestic funding.

IV. Progress towards global goals and targets

33. Progress against the targets of the Sustainable Development Goals and the Global Technical Strategy is summarized each year by WHO in the *World Malaria Report*, which provides a comprehensive overview of trends in programme financing, intervention coverage and malaria cases and deaths. Data are received from national malaria control programmes in endemic countries — through WHO regional offices — and are complemented by information received through household surveys, notably demographic and health surveys, multiple indicator cluster surveys and malaria indicator surveys.

Sustainable Development Goals

34. Malaria is included under Goal 3, target 3, of the Sustainable Development Goals, together with HIV/AIDS, tuberculosis and other neglected tropical diseases, which aims to "end the epidemics of AIDS, tuberculosis, malaria and other neglected tropical diseases" by the year 2030. WHO interprets this target as the attainment of the targets set out in the Global Technical Strategy. In addition to target 3 of Goal 3, reaching the Global Technical Strategy targets will also contribute to other health-related goals of Goal 3, which aims to ensure healthy lives and promote well-being for all at all ages. It will also contribute to other Sustainable Development Goals and benefit from the achievement of those goals, particularly Goal 1 (end poverty in all its forms everywhere), Goal 4 (ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), Goal 5 (achieve gender equality and empower all women and girls), Goal 8 (promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all) and Goal 10 (reduce inequality within and among countries).

35. An assessment of global malaria trends between 2010 and 2015 indicates that the world is not on track to meet the Global Technical Strategy milestone of reducing malaria mortality and case incidence rates globally by 40 per cent by 2020. In spite of the downward trend in the rate of new malaria infections since 2000, by the end of 2015, only 40 of the 91 countries with malaria transmission were considered to be on track to achieve the global target of a 40 per cent reduction in case incidence between 2015 and 2020. This global milestone will be achieved only if reductions in case incidence are accelerated in countries with high incidence rates. In relation to malaria mortality, rates of reduction will need to increase in those countries that have higher numbers of deaths for the global milestone of a 40 per cent reduction in mortality rates to be achieved by 2020. By the end of 2015, 39 of the 91 countries and territories with malaria transmission were estimated to have achieved a reduction of 40 per cent or more in mortality rates between 2010 and 2015, 14 had reductions of 20 to 40 per cent and 8 had experienced increases in mortality rates of 20 per cent. A further 10 countries reported no deaths in 2010 and 2015.

36. On the other hand, the world is on track to meet the Global Technical Strategy milestone of eliminating malaria from at least 10 countries by 2020. Between 2000

and 2015, 17 countries attained zero indigenous cases for three consecutive years or more (Argentina, Armenia, Azerbaijan, Costa Rica, Egypt, Georgia, Iraq, Kyrgyzstan, Morocco, Oman, Paraguay, Sri Lanka, Syrian Arab Republic, Turkey, Turkmenistan, United Arab Emirates and Uzbekistan). *The World Malaria Report 2016* highlights that in 2015, 10 countries reported fewer than 150 indigenous malaria cases and that a further 9 countries reported between 150 and 1,000 indigenous cases.

37. It is estimated that a cumulative 6.8 million fewer malaria deaths have occurred globally between 2001 and 2015 than would have been the case had incidence and mortality rates remained unchanged since 2000. Of the estimated 6.8 million fewer malaria deaths, 6.6 million (97 per cent) were in children under 5 years of age. The highest proportion of deaths was averted in the WHO African Region (94 per cent). As a consequence of reduced malaria mortality rates, particularly among children under 5 years of age, it is estimated that life expectancy at birth has increased by 1.2 years in the WHO African Region. Not all of the deaths averted can be attributed to malaria control efforts and some progress is probably related to increased urbanization and overall economic development, which has led to improved housing and nutrition.

V. Recommendations

38. **A concerted and coordinated global effort will be needed to substantially reduce malaria transmission, morbidity and mortality by 2030 and achieve the targets set by Global Technical Strategy for Malaria 2016-2030. Progress can be accelerated through a multi-pronged response: by a major expansion of currently available life-saving interventions; by making malaria a higher political priority; by increasing accountability; by strengthening regional and cross-border collaboration; and by ensuring that the development and use of new tools and approaches are maximized. Closing gaps in access to proven malaria control tools is a top priority for WHO. On World Malaria Day 2017, WHO called attention to critical gaps in prevention, particularly in sub-Saharan Africa. In 2018, WHO will publish a more comprehensive analysis on gaps in prevention, diagnostic testing and treatment worldwide.**

39. **The expansion of malaria interventions can be used as an entry point for strengthening health systems more broadly, including maternal and child health services and laboratory services, and to build stronger health information and disease surveillance systems. The strengthening of these systems will further support the effective case management of malaria. Continued scale-up of integrated community case management of malaria, pneumonia and diarrhoea in children under 5 years of age in the highest burden countries, and a strengthening of integrated delivery systems for malaria prevention tools, would be a cost-effective solution to help in bridging systems gaps until health infrastructures are further strengthened.**

40. **There is an urgent need to optimize existing health financing in general, including support for malaria control through the use of surveillance to increase programmatic impact and efficiency. Yet total funding must increase substantially if the Global Technical Strategy 2020 milestone of $6.4 billion is to be achieved. Adequate and predictable financing is also essential for recent successes to be protected. If countries were to fall back on existing levels of intervention coverage, it could result in a loss of many of the gains and investments that have been dedicated to this cause.**

41. Endemic countries are urged to increase the domestic resources they make available to combat the disease. It is also recommended that they review and strengthen national strategic plans in line with WHO technical recommendations, and embed those firmly in national health sector and development plans. To achieve better impact and to ensure that successes are sustained, countries should increasingly adopt a multisectoral approach to combating the disease, and build on synergies with other development priorities, including universal health coverage and engagement with development partners and the private sector on implementing an effective vector control response.

42. Global development partners and endemic countries should strengthen efforts to address emerging biological threats to malaria control. Parasite resistance to artemisinin can be prevented through the implementation of WHO recommendations in the Global Plan for Artemisinin Resistance Containment. Strong political commitment is required to launch a coordinated and renewed effort to phase out the use of oral artemisinin-based monotherapies and to remove from markets antimalarial medicines that do not meet WHO prequalification standards. The emergence of insecticide resistance can be controlled through the adoption of recommendations contained in the Global Plan for Insecticide Resistance Management in Malaria Vectors.

43. There is a critical need to strengthen malaria surveillance and data quality in all endemic regions to enable ministries of health to direct financial resources to populations most in need, and to respond effectively to disease outbreaks. Given the plethora of partners on the ground, mechanisms for country-based coordination of technical assistance should be strengthened to achieve alignment over the best approaches to implement WHO technical guidance. Additional financing is needed to support the sharing and analysis of best practices to address urgent programmatic challenges, to improve monitoring and evaluation and to conduct regular financial planning and gap analysis.

44. The contribution of the scientific community and the private sector remain essential: new products such as improved diagnostic tools, more effective medicines, new insecticides and more durable insecticide-treated bednets are all fundamental to ensuring sustained progress in efforts to combat the disease. The remarkable progress against malaria can only be maintained through a concerted and focused multi-stakeholder effort, built on the foundation of global political commitment, continuous scientific advancement and vigorous innovation.